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DOD ENGINEERING FOR TRANSPORTABILITY

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DEPARTMENTS OF THE ARMY, THE NAVY, THE AIR FORCE, AND THE DEFENSE LOGISTICS AGENCY

ARMY REGULATION 70–44
OPNAV INSTRUCTION 4600.22B
AIR FORCE REGULATION 80–18
MARINE CORPS, ORDER 4610.14C
DEFENSE LOGISTICS AGENCY
REGULATION 4500.25

DEPARTMENTS OF THE ARMY, THE NAVY,
AND THE AIR FORCE,
AND THE DEFENSE LOGISTICS AGENCY
WASHINGTON, DC, *1 Setpember 1978*

RESEARCH AND DEVELOPMENT

DOD ENGINEERING FOR TRANSPORTABILITY

This revision is published to reflect organization changes, redefine transportability problem items, revise appendix B to reflect current procedures for requesting transportability test loadings and airborne tests by Air Force transport aircraft, and to cover optional testing on surface transport equipment. Supplements should be issued within each of the services to establish internal responsibilities and procedures in implementing this regulation. (As supplements are issued, the DOD component will furnish one copy to each designated transportability agent.)

1. Purpose and scope. *a.* This regulation designates the transportability agencies, promulgates policy, assigns responsibilities, and outlines procedures for conducting the Engineering for Transportability Program within the Army, Navy, Air Force, Marine Corps, and Defense Logistics Agency (DLA).

b. Engineering for transportability is a DOD-wide function assigned to the Services and DLA.

c. The objective is to assure that systems/equipment/munitions (S–E–M), including components and spare parts, are designed, engineered, and constructed so that the required quantities can be efficiently moved by available means of transportation.

2. Authority. The DOD Directive 3224.1, subject: Engineering for Transportability, 29 November 1977, is the authority for this regulation.

3. Definitions. For definitions essential to understanding engineering for transportability, see appendix A.

4. Policy. *a.* Transportability will be a major consideration in—

(1) Formulating the priority of characteristics to be considered in the design of any new item of materiel or modification of any existing item of materiel; or adoption of a commercial nondevelopmental item;

***This regulation supersedes AR 70–44/OPNAVINST 4600.22A/AFR 80–18/MCO 4610.14B/DSAR 4500.25, 9 August 1971.**

(2) Developing, acquiring and testing S–E–M, and developing logistic support for systems and equipment consistent with the integrated logistic support process (DOD Directive 4100.45);

(3) Evaluating the performance, supportability, and acceptability of new systems or modified materiel or commercial nondevelopment items; and

(4) Modifying existing transportation systems.

b. Transportability will be a major consideration in system design to be weighed and balanced with system functional safety, reliability, and maintainability characteristics. The required type (highway, rail, air, ship, etc.) of transportability, together with any special requirement for tactical transport, will be stated in the Required Operational Capability or other appropriate requirement documents will be explicitly stated in developmental tasks and in systems prime item and development specifications. Lifting and tiedown requirements for all modes of transport will be considered since logistical movement will be required throughout the item life cycle.

c. Each materiel development command program or project will have an identified transportability agent or focal point responsible to ensure that the requirements of the Engineering for Transportability Program are implemented in program(s) or projects(s) and for coordination with the service transportability agents designated in paragraph 5.

d. S–E–M developed and/or required for procurement by the military services will be of such gross weight and have such dimensions as to permit handling and movement by existing or programmed commercial and/or military transportation facilities. To achieve effective utilization of the transportation facilities, the following factors must be considered:

(1) Transportability criteria, including transportation constraints, will be used when planning and designing new items or modifying existing items of S–E–M to assure transportability by available means of transportation.

(2) Gross weight and dimensions will include packaging of item in shipping configuration.

(3) During design of oversized and/or overweight S–E–M, cost effectiveness of sectionalization will be evaluated, with transportation and onsite reassembly costs considered, to ensure maximum economy and effectiveness with respect to life cycle performance.

(4) During the design planning phase of S–E–M, consultations with the service transportability agent is recommended if the item is expected to require special permits, unusual routing, etc., when being moved.

(5) If more than one mode of transportation is required to move S–E–M in its operational application, the design must accommodate all required modes.

(6) S–E–M designed to carry a liquid content must be transportable within published legal and operational limits for worldwide land, air, and water movement.

(7) Blocking, bracing, slinging, lifting, and tiedown procedures to ensure safe logistical and tactical transport will be developed concurrently with development and test of the item. Slinging and tie-down provisions will be designed in accordance with MIL–STD–209.

(8) Where practicable, S–E–M will be designed to be compatible with American National Standards Institute (ANSI) and International Organization for Standardization (ISO) standard cargo containers and/or standard pallets and containers identified in Federal or military specifications or standards.

(9) Shelters and/or special purpose vans developed to provide for operational requirements such as automatic data processing vans, repair machine shops, communications vans, fire direction centers, etc., will conform to ANSI/ISO container specifications to the extent practical (DOD Instruction 4500.37).

(10) S–E–M designed for movement by Air Force cargo aircraft will meet the requirements of MIL–A–8421 except nuclear weapons (see AFR 122–10). The specific types of aircraft in which transport will be required will be designated in the materiel requirements documents.

(11) New vehicles which are to be transported as cargo will have a data plate or decal diagram which depicts the tiedown and lifting

point locations, their strength rating, and the location of the center of gravity.

(12) Provision will be made for protection of fragile, sensitive, and/or hazardous S–E–M during transportation.

(13) Minimization of weight and cube will be an objective during design and fabrication.

(14) An efficient relationship will be maintained between the design of military vehicles (including support equipment) and State and Federal standards for the design of public highways to ensure the efficient and effective use of such highways by towed or selfpropelled wheeled and tracked military vehicles, or when such vehicles are transported as cargo. (See AR 55-80/OPNAVINST 11210.1/AFR 75–88/MCO 11210.2A/DSAR 4500.19, Highways for National Defense, for related responsibilities.) When a potential transportability problem item is being designed for use in oversea areas, consideration should be given to coordinating with appropriate oversea major commands to determine the feasibility of moving the item by the required modes within their respective areas of responsibility.

e. Transportability of S–E–M by the required modes of transport will be proven by test, analysis, or analogy prior to item procurement.

f. Safety will be a primary transportability objective.

g. Transportability criteria will comply with DOD directives relating to environmental criteria, the intent of the National Environmental Policy Act, and with the criteria and standards published by the Environmental Protection Agency. The intent of state and local pollution abatement laws, regulations, criteria, and standards will also apply.

5. Transportability agents of the Military Services. *a. Department of the Army:* Commander, Military Traffic Management Command, Washington, DC 20315.

b. Department of the Navy: Commander, Naval Supply Systems Command, Deputy Commander for Transportation, Washington, DC 20376.

c. Department of the Air Force: AFSC/LGTT, Washington, DC 20334.

d. US Marine Corps: Commandant, US Marine Corps (LFT–3), Washington, DC 20380.

e. Defense Logistics Agency: Director, Defense Logistics Agency, DLA–HT, Cameron Station, Alexandria, VA 22314.

6. Responsibilities. *a.* General responsibilities.

(1) The Department of the Army will—

(a) Prepare and coordinate joint regulations implementing the Engineering for Transportability Program with the other DOD components.

(b) Coordinate DOD transportability interest in common-user land transportation programs with Federal, State, and Defense agencies and with appropriate oversea agencies and integrate the foreseen needs of the DOD components into these programs. As the single manager for military traffic, land transportation, and common-user ocean terminals, the Department of the Army will coordinate the land transportation, inland waterway, Army air, logistics over the shore, and ocean terminals portion of the Engineering for Transportability Program.

(2) The Department of the Navy will coordinate DOD transportability interest in common-user ship construction and modification programs with appropriate Federal and defense agencies and integrate the foreseen needs of the DOD components into these programs. As the single manager for ocean transportation, the Department of the Navy will coordinate the ocean transportation portion of the Engineering for Transportability Program.

(3) The Department of the Air Force will coordinate DOD transportability interests in common-user aircraft construction and modification programs with appropriate Federal and defense agencies and integrate the foreseen needs of the DOD components into these programs. The Department of the Air Force will coordinate the commercial and Air Force air transportation, including US Air Force air terminals, portion of the Engineering for Transportability Program.

b. Transportability Agent Responsibilities. Service transportability agents designated by their respective services and/or command, local or program/project transportability agents as designated by service regulations will—

(1) Implement regulations governing the Engineering for Transportability Program for their respective areas of materiel responsibility.

(2) Provide advice on transportability matters and engineering service for their requesting commands and agencies and other DOD components.

(3) Maintain official liaison for their respective services with other DOD components, with major commands of their respective services, and with other appropriate Government and non-Government agencies in matters pertaining to transportability.

(4) Prepare, coordinate, sponsor for publication, and maintain joint transportability criteria covering modes, terminals, and equipment for which their departments have transportability engineering responsibility.

(5) Develop, coordinate, and issue engineering design and test criteria, including standards and handbooks, as appropriate, for the design and test of loading, blocking, bracing, tiedown, securing, and handling procedures for movement of S–E–M by the modes for which their respective services are responsible. The transportability agents should not be required to participate in all test and evaluation programs when other commands or activities have the capability.

(6) Ensure the preparation, coordination, and publication of joint transportability guidance for S–E–M of their respective services.

(7) When requested, perform transportability reviews of potential transportability problem items during the concept development and S–E–M acquisition process, and furnish information copies of the reviews to other concerned transportability agents.

(8) Provide requesting commands and staff agencies with Transportability Approvals or, as appropriate, recommendations for correction of deficiencies for the configuration and characteristics of S–E–M of their respective services, and when requested, for materiel of other military services.

(9) Ensure that transportability of new S–E–M is proved by the developing agency through testing during research, development, test, and evaluation (RDTE) programs, or by analogy to similar materiel (configuration and gross weight), or by evaluating pertinent characteristics of candidate nondevelopment items. Document test results and transportability characteristics for transportability guidance.

(10) Assist in transportability trade-off studies to reduce life cycle costs of S–E–M.

c. Service or other DOD activities responsible for identification or development of materiel requirements, research, development, test, modification, logistic support, procurement, or contract administration, as appropriate, (and as further delineated in implementing regulations for their respective service or DOD components), will—

(1) Include in development guides and specifications, and materiel requirements appropriate transportability requirements.

(2) Monitor materiel during research, design, development, test, modification, and procurement to identify transportability problem items.

(3) Test S–E–M during RDTE programs to demonstrate transportability and document test results for transportability guidance (for S–E–M requiring transport in US Air Force cargo aircraft, see appendix B for procedure for obtaining Air Transportability Test Loadings),

(4) Request a Transportability Approval for all transportability problem items prior to design freeze or procurement authorization.

7. Procedures. The procedures which follow identify the principal steps that must be taken by the transportability agent(s) (para 5) and service activities, working in close and official liaison with each other and with transportability agents of other services, to provide the necessary continuity and accomplish economical and effective DOD-wide transportability in support of the Armed Forces. The implementing service regulations will delineate the responsibilities and describe the working relationships within each service.

a. Representatives of the service transportability agents will hold joint meetings at least semiannually and will arrange for transportability working groups, as required, to exchange

information and promote the purposes of the Engineering for Transportability Program. Chairman and secretarial services will be rotated among the transportability agents. The Department of the Army will provide a permanent secretariat for the purpose of administrative continuity and record keeping.

b. Each military service, in accordance with responsibilities herein assigned, will perform the necessary studies to develop, coordinate, and publish joint transportability criteria for transportation modes and systems worldwide. These criteria will be used in the conceptual phase, in advanced development/validation and in contract definition when transportability is an issue. Criteria will also be used in the preparation of development guides and military characteristics; for research, development, and preparation of test and logistic plans; and for inclusion in contract procurement documents. Military characteristics and developmental guides and specifications for specific S–E–M will set forth those transportability characteristics/requirements for all modes of transportation for which transportation is required.

c. Each military activity (including its contractors) responsible for the design development, procurement, logistic support, or modification of materiel will (at the earliest possible date in the RDTE cycle or prior to off-the-shelf procurement) identify potential transportability problem items as herein defined (para A–9), and will prepare and submit a Transportability Report to the appropritate transportability agent for transportability review and appropriate in-process approvals.

(1) The transportability agent receiving a Transportability Report which is applicable only to the mode(s) for which their service has single manager authority, will review the report and make recommendations, in accordance with the service's internal regulations.

(2) The transportability agent receiving a Transportability Report from an element of their service, which may be applicable to the single manager responsibility of another service, will be responsible for ensuring that the report is referred to the appropriate transportability agent(s) as cited in paragraph 5 for review and comment. The appropriate agent(s) will review the report and furnish comments and recommendations, as appropriate, in accordance with the reviewing service's internal procedures, and advise the requesting transportability agent within 30 days.

d. DOD components with acquisition responsibilities will conduct a transportability test or evaluation when required to assure that S–E–M meets the transportability requirements specified in the materiel requirements documents. Test results will be documented for use in the preparation of transportability guidance. Procedures for obtaining air and surface transportability tests and approval are prescribed in appendixes B and C. respectively.

e. Before the execution of a materiel procurement contract or design freeze pertaining to a transportability problem item (para A–9), the activity responsible for RDTE, off-the-shelf procurement, or modification design approval will obtain a Transportability Approval from its service, command, local or program/project agent and include the Transportability Approval in the formal record of development actions. The responsible activity will take further action as necessary to assure that materiel received from a contractor is in compliance with transportability requirements prior to acceptance. A new Transportability Approval will be required when an item is modified so as to increase dimensions or change other significant transportability characteristics.

f. Before a new product or procurement item requires transportation, joint transportability guidance, if determined appropriate, will be prepared in accordance with responsibilities outlined in this regulation and made available to appropriate transportation agencies and concerned military units. The guidance will provide validated information on items of materiel that require transportation and terminal handling so as to ensure maintenance of materiel integrity, and economical and effective transportation.

g. Each service responsible for the development of materiel items of transportation systems will ensure that modifications, which may affect the transportability characteristics of these

items, are fully coordinated with the other services prior to formalizing and implementing modification orders.

h. Service transportability agents will be responsible to monitor the elements of commercial transportation systems for which they have transportability responsibility to ensure that changes which may affect transportability are coordinated with the DOD components.

APPENDIX A
DEFINITIONS

The following definitions are applicable to this regulation:

A–1. Fragile item. An item of systems/equipment/munitions (S–E–M) which is susceptible to damage and/or loss of serviceability during transport and handling, and which requires special shipping procedures or equipment, environmental control or special packaging for protection during transport.

A–2. Hazardous materiel. A substance or materiel which has been determined and designated by the Secretary of Transportation and/or the services to be capable of posing an unreasonable risk to health, safety, and property when transported. Included are explosives, article such as flammable liquids and solids, and other dangerous oxidizing materiels, corrosive materiels, compressed gases, poisons and irritating materiels, etiologic agents and radioactive materiels. (See provisions of Title 49 of the US Code and AFR 71–4/TM 38–250/NAVSUP PUB 505 (REV) MCO P4030.19D/DSAM 4145.3.)

A–3. S–E–M materiel. All items and item components necessary for the equipment, maintenance, operation, and support of military activities without distinction as to their application for administrative or combat purposes, excluding ships.

A–4. Transportability. The inherent capability of materiel to be moved by towing, by self-propulsion, or by carrier via railways, highways, waterways, pipelines, oceans, and airways utilizing existing equipment or equipment that is planned for the movement of the item being considered.

A–5. Transportability approval. A statement by the appropriate transportability agent that an item of materiel, in its shipping configurations, is transportable by the mode(s) of transportation specified in development guides or materiel requirements, or meets amended transportability characteristics approved by higher authority.

A–6. Transportability criteria. The physical characteristics of the individual modes of transportation, together with legal and administrative requirements, which must be considered in the design of items of S–E–M to assure that they can be moved efficiently by existing and proposed transportation systems.

A–7. Transportability engineering. The performance of those functions required in identifying and measuring the limiting constraints, characteristics, and environments of transportation systems; the integration of these data into design criteria to utilize operational and planned transportation capability effectively; and the development of technical transportability guidance.

A–8. Transportability guidance. Published information needed during loading, securing, moving, and handling operations to ensure safe and effective logistics transportation of an item of military equipment, or component thereof, over railways, highways, waterways, oceans, airways, and off-road either as cargo, tow, or by self-propulsion. The information includes the technical and physical characteristics affecting transportability such as: loading, blocking, bracing, tiedown and anchoring; validated dimensions with metric equivalents; signficant considerations for movement by air, land, and water transportation, sectionalization to conform with the limits of the various modes of transportation; center of gravity and distribution of load; shipping cube for both operational and sectionalized configuration; and transportation regulations and special procedures and permits for movement. Transportability guidance is transportation oriented and is produced from transportability-related information developed and validated during the research, development, test, and evaluation process and in liaison with

the transportation industry. It is briefly summarized and includes only that information essential to safe, effective, and timely movement.

A-9. Transportability problem item. An item of equipment in its proposed shipping configuration which, because of its size, weight, or fragile or hazardous characteristics, or lack of adequate means for lifting and tie-down, may be denied movement, will require special permits or waivers and/or special equipment or handling, or be unacceptably delayed when moving within existing or newly designed transportation systems. An item will be considered as a potential problem item when any one of the following conditions apply:

a. Materiel does not meet the transportability characteristics specifically imposed by a military service.

b. The item is wheeled or tracked and is to be towed or self-propelled on- or off-highways.

c. The materiel is fragile or hazardous. Hazardous materiel which is packaged in accordance with the requirements of Title 49 of the United States Code of Federal Regulations, and AFR 71-4/TM 38-250/NAVSUP PUB 505 (REV/MCO P 4030.19D/DSAM 4145.3, will not be considered as a potential transportability problem item solely because of its hazardous properties.

d. The materiel is suited for transport by van or stake body trucks or cargo containers and exceeds any one of these conditions:

(1) Length—18.5 feet (5.639m).

(2) Width—7 feet (2.134m).

(3) Height—6.5 feet (1.981m).

(4) Weight—10,000 pounds (4535kg).

e. The materiel design requirement includes transportability in US Air Force aircraft, and the item exceeds any one of the following conditions:

(1) Length—20 feet (6.100m).

(2) Width—8 feet (2.438m).

(3) Height—8 feet (2.438m).

(4) Weight—20,000 pounds (9070kg).

(5) Weight per linear foot—1,600 pounds (726kg).

(6) Floor contact pressure—50 psi (3.515 kg/sq cm).

(7) Maximum axle load (vehicle with pneumatic tires)—5,000 pounds (2268kg).

(8) Maximum wheel load (vehicle with pneumatic tires)—2,500 pounds (1134kg).

(9) Any item which requires special equipment or procedures for loading in an aircraft such as nuclear weapons.

f. The materiel is not to be transported by either method stated in *d* or *e* above and exceeds one of these conditions:

(1) Length—32 feet (9.754m).

(2) Width—8 feet (2.438m).

(3) Height—8 feet (2.438m).

(4) Weight—11,200 pounds (5080kg).

A-10. Transportability review. An evaluation of the transportability of an item of S-E-M or its components to assess its ability to be transported by the modes of transportation specified in the materiel requirements documents.

A-11. Transportability report. A report submitted on transportability problem item during S-E-M development/acquisition with all information necessary for a comprehensive transportability review. The report identifies transportability characteristics of newly designed, modified, or off-the-shelf procured materiel or components thereof and will contain, to the extent available and pertinent, the following information:

a. Nomenclature.

b. Brief description.

c. Mode(s) of transportation required and/or designed for movement.

d. Specialized service and equipment which may be employed for shipment (bilevel and trilevel railcars, etc.).

e. Planned item quantity (by fiscal year quarter).

(1) Production.

(2) Total inventory.

f. Configuration of the item assembled or prepared for transportation, including packaging, if required, to include:

(1) A sketch or drawing showing plan, side and end views with dimensions for length, width, height, and location of center of gravity.

(2) Weight.

(3) Unusual dimensional characteristics, such as projections.

(4) Lifting and tiedown provisions, to include location and capacity of each attachment and total number.

g. Fragility, shock, and vibration considerations.

h. Special environmental (temperature limits, pressure limits, humidity control, power source required, etc.) considerations.

i. Hazardous characteristics. For each item that is classified as hazardous materiel, give the following information:

(1) The US Department of Transportation (DOT) class.

(2) The DOT designated shipping name.

(3) Net explosive weight (DOT class A or B explosives only).

(4) Venting requirements.

(5) Protective clothing requirements.

(6) Grounding requirements.

(7) Disaster response force requirements which include:

(a) Security.

(b) Firefighting.

(c) Medical.

(d) For explosive items: firefighting/withdrawal time (min.) and firefighting/withdrawal distance (ft.).

(e) Any other than above.

(8) Data to show compliance with applicable United States Code of Federal Regulations.

(9) Quantity distance class and storage compatibility groups.

j. Wheeled/tracked configuration. For each item that is in a wheeled/tracked configuration, give the following:

(1) Footprint data (plan view, showing length and width of actual area in contact with the ground).

(2) Dimensions indicating relative positions of the areas in contact with the ground.

(3) Number of tires, size, location, and inflation pressure.

(4) Pressure of track on surface in pounds per square inch.

(5) Individual wheel loads.

(6) Axle loads (empty and loaded) and spacing.

(7) Front and rear overhang data by dimensional sketch.

(8) Wheelbase.

(9) Distance from ground to the lowest part of chassis or equipment.

(10) Turning radius.

(11) Speed range.

(12) Statement of compliance with State and Federal regulatory requirements when applicable.

k. Statement of compliance with Federal safety standards.

l. Sectionalization possibilities. Comments on feasibility of disassembly and reassembly. All data required for the assembled item are required for each component(s) or subassembly which exceeds the criteria outlined in paragraph 9.

m. Contemplated origin(s); i.e., place(s) of manufacture or procurement.

n. Any specialized materials handling equipment needed to support movement.

APPENDIX B

AIR TRANSPORTABILITY TEST LOADINGS AND AIRDROP TESTS BY AIR FORCE TRANSPORT AIRCRAFT

B-1. Air Transportability Test Loadings and Airborne Tests by Air Force Transport Aircraft. *a. General.* Static test loadings, airborne tests, and design analysis are performed to ensure compatibility of cargoes and equipment items with the dimensional and structural limitations of the aircraft; to ensure the safe movement of the item and the safe operation of the aircraft when loaded; and to develop guidance for the most efficient use of aircraft space and for subsequent air movement of the item. Items being tested will go through a sequence of events in accordance with a test plan prepared by the item developer, approved by the Air Transportability Test Loading Agency (ATTLA), Air Force Systems Command, and executed by the test director. The site of the test will be a facility that can provide a suitable aircraft runway and testing location. If the item is expected to move in more than one type of aircraft, a test loading with each aircraft may be necessary. Military Services should consider this possibility when preparing a test loading request and, when advisable, plan to consolidate two or more tests for performance at the same time.

b. Types of tests.

(1) *Static loading tests.* Static loading tests will consist of loading, tiedown, and unloading of an item aboard an Air Force aircraft. The test is to ensure that the item has no interface problem and to develop procedures. When an item is a modification of an already tested item of equipment, a review without loading may be accomplished.

(2) *Airborne tests.* Airborne tests will consist of either airdrop, wherein an item is ejected/extracted from aircraft in-flight, or airborne transport, where an item undergoes a flight.

(a) Airdrop. Airdrop tests of nonstandard loads must receive approval of the USAF Aeronautical Systems Division, Airdrop Engineering Office (ASD/ENECA), Wright-Patterson AFB, prior to test to ensure compliance with all flight safety requirements and interface with aircraft systems.

(b) Airborne transport tests. Airborne transport tests of an item will be performed only after completion of a successful static loading test or a determination by the ATTLA that a formal static loading test can be waived. Tests will involve actual air movement and will subject the item to the dynamic, environmental, and operational conditions that can normally be expected to exist in transport aircraft operations. This test should only be requested if an item is sensitive and susceptible to damage from air transport and, if the item is to be operated during flight, or if operator personnel are required to occupy the item for take-off, flight, or landing. Instrumentation will be installed and operated by the requester to record, to the extent deemed necessary, the dynamic and environmental characteristics of each test air movement.

(3) *Design analysis.* The ATTLA will, upon request, review items in design, prototype, or preproduction hardware phase to determine if the item is air transportable, or if any potential problem area exists. Further, the ATTLA will provide design assistance to ensure air transportability requirements are met where possible. A request for a design analysis may be submitted at any time.

c. Resources.

(1) Department of the Air Force will provide the following equipment and personnel during the test:

(a) Aircrafts and aircrews.

(b) Major air command designated test director or loadmaster.

(c) Technical order writer for aircraft.

(d) Photographer (when test is performed at an Air Force base or installation).

(e) Test space, 463L materials handling equipment, and equipment operators (when test is performed at an Air Force base, or when special arrangements are made with ATTLA to have these services, or equipment provided as part of the test).

(f) Peculiar support equipment (certain aircraft jacks, cradles, cranes, etc.) can be provided when special arrangements are made with ATTLA.

(g) Necessary aircraft engineering personnel.

(h) Emergency equipment (ambulance, fire trucks, etc., at Air Force bases).

(2) The service/activity requesting the test loading will provide the following equipment and personnel during the test:

(a) Item to be test loaded, together with any specialized handling items or attachments (lifting beams, mobilizers, item-leveling jacks, shoring, etc.).

(b) Engineering, safety, and test personnel familiar with the item.

(c) Necessary safety equipment (special clothing, handling, gear, etc.).

(d) Photographer and emergency equipment; e.g., ambulances, fire trucks, etc., when not performed at an Air Force installation.

(3) *Aircraft.* When airlift aircraft (C–130, C–141, or C–5) is required, a special assignment airlift mission will be requested from Military Airlift Command (MAC), through normal channels in accordance with AR 59–8/AFR 76-38/ OPNAVINST 4630.18D/MCO 4630.6C/DSAR 4540.9, concurrent with the request for the test loading. The request will include a transportation account code or fund citation for payment to MAC at the rates outlined in AFR 76–11.

d. Requirements for test loading or analysis, as appropriate. Any item proposed to be moved by US Air Force transport aircraft that exceeds any one of the following factors must be submitted to the ATTLA for test loading or analysis, as appropriate:

(1) Size: 8 by 8 by 20 feet. (2.438 x 2.438 x C.100m)

(2) Weight: 20,000 pounds (9070 kg)

(3) Weight per linear foot: 1,600 pounds. (726 kg)

(4) Floor contact area weight limit: 50 psi. (3.515 kg/sq cm)

(5) Maximum axle load (vehicle with pneumatic tires): 5,000 pounds. (2268 kg)

(6) Maximum wheel load (vehicle with pneumatic tires): 2,500 pounds. (1134 kg)

(7) Item characteristics are such that the aircraft or Air Force materials handling environment pose problems in movement.

(8) All other equipment when a loading test is deemed necessary.

e. Coordination. The ATTLA, acting in behalf of the Air Force (AFR 76–18) will review, evaluate, process, and approve all test loading/ airborne test requests to include nuclear weapons. The ATTLA will notify the requesting agency of the action to be taken as a result of the request, will coordinate tests with the requesting activity, the Air Force command performing the test, the appropriate -9 and -16 cargo loading manual managers, the Director of Aerospace Safety, and Air Force engineering and technical personnel to ensure adequate preparation, scheduling, documentation, and completion of tests. To facilitate coordination, the DD Form 2083 (fig. B–1) regardless of origin, must arrive at ASD/ENECA, Wright-Patterson AFB, OH 45433, 60 days prior to the desired date of action.

f. Approval and publication of transportability guidance. As a result of tests, ATTLA will, on behalf of the Air Force, provide approvals of the loading, securing, and off-loading procedures to the service requesting the test loading for inclusion in joint transportability guidance publications. Concurrently, the ATTLA will initiate action to have published operational supplements to the -9/-16 sections of aircraft technical orders for future movement of the item by the Air Force transport aircraft.

g. Changes to approved procedures. Requested changes by item developer to Air Force approved loading and movement procedures will be processed through the ATTLA. The ATTLA

will make all appropriate distribution of change requests and conduct necessary coordination within the Air Force.

B–2. Preparation of requests for transportability test loading. DD Form 2083 has been developed to facilitate advance coordination of the analysis or air test loading and surface transportation equipment tests, and to ensure completeness in reviewing design concepts. This form is required when requesting Air Force air transportability design analysis, static loading test, or airborne test. DD Form 2083 may also be used for requesting test loadings by the surface modes of transportation, so, some overlap occurs. The Army users will locally reproduce DD Form 2083 on 8 x 10½ inch paper in accordance with figure B–1. DD Form 2083 is available for Navy users from Commander, Naval Supply Systems Command, (SUP–081B), Washington, DC.

a. Distribution of DD Form 2083.

(1) Requests for air transportability design analyses, air test loadings, and airborne tests.

(a) Army: MTMC–SA (two copies); AFSC/LGT, Andrews AFB, MD 20334 (one copy); ASD/ENECA, Wright-Patterson AFB, OH 45433 (one copy with complete technical data). For airdrop tests, also provide one copy with complete technical data to Commander, US Army Natick R&D Command, ATTN: DRXNM-UAS, Natick, MA 01760.

(b) Air Force: ASD/ENECA, Wright-Patterson AFB, OH 45433 (one copy); AFSC/LGT, Andrews AFB, MD 20334 (one copy).

(c) Navy: ASD/ENECA, Wright Patterson AFB, OH 45433 (one copy); AFSC/LGT, Andrews AFB, MD 20334 (one copy; and Commander, Naval Supply Systems Command, Deputy Commander for Transportation, Washington, DC 20376 (one copy).

(d) Marine Corps: ASD/ENECA, Wright-Patterson AFB, OH 45433 (one copy); AFSC/LGT, Andrews AFB, MD 20334 (one copy); and Commandant, US Marine Corps (LFT–3), Washington, DC 20380 (one copy).

(e) Defense Logistics Agency: ASD/ENECA, Wright-Patterson AFB, OH 45433 (one copy); AFSC/LGT, Andrews AFB, MD 20334 (one copy); and Director, DLA–HT, Defense Logistics Agency, Cameron Station, Alexandria, VA 22314 (one copy).

b. When completing DD Form 2083, required information should be given as completely as possible. Provide precise measurements and information and include photographs, sketches, drawings, or any additional data that would be helpful in determination of transportability requirements. This form has been developed to cover requests for test loadings for all materiel, and all sections may not be applicable. When an item does not apply, enter "NA" (not applicable), or, if unknown, enter "UNK". If data are unavailable, but are forthcoming, indicate this in appropriate data item space and provide projected date of availability. If additional space is required to provide information, identify data item by number and provide description on a separate sheet, and attach to DD Form 2083. The following item requirements correspond to item numbers on DD Form 2083, and are to be used as a guide for completing this form.

(1) *Project name.* Identify a short name for the project.

(2) *Security classification.* As determined by the originating DOD element, indicate the security classification for the item to be test loaded; state if unclassified (AR 380–5, OPNAVINST 5510.18B, and AFR 205–1 are applicable). Since security classification may be an overriding factor, it will be included in any initial project identification.

(3) *Contractor.* Provide name of contractor and person knowledgeable about the item, and complete phone number if not included in signature blocks.

(4) *Contract number.* Provide contract number and name of Government agency with whom the contract was signed if different from submitting organization.

(5) *Brief item description.* Provide description in nontechnical terms of the item. For example: Construction equipment, modified, commercial bucket loader.

(6) *Type of request.*

(a) Design analysis. ATTLA will review the item design and indicate potential air trans-

portability problem areas and suggest possible corrective action or approve design.

(b) Air transportability review. Where an item is a modification or similar to an item that has been approved for air transport, this non-loading method can be used for a new approval.

(c) Static test loading. See B–1*b*(1).

(d) Test loading with airborne test or movement. See B–1*b*(2) and B–1*c*. Indicate on DD Form 2083 item 17, details of test or movement.

(7) *Proposed test date.* Provide a proposed date. This may be changed due to aircraft and test personnel availability.

(8) *Mode transportability potential.* (anticipated frequency of movement.)

(a) One-time movement. Equipment that is only to be moved once. A one-time movement may also be indicated if the item is moved more than once in a relatively short time frame and will not be moved again.

(b) Occasional movement. An item of equipment that is to be moved on a very limited basis; for example, three times a year for the next 5 years.

(c) Routine movement. Equipment that is to be moved as part of a deployment, such as a 5-ton truck or as routine resupply, would be within this category.

(9) *Type of aircraft.* Indicate both the type(s) of aircraft on which the item is to be tested and moved. An item may be tested on one aircraft yet projected movement may be for three types of aircraft. Data obtained in one test loading can, in many cases, be used to approve loads in other aircraft.

(10) *Joint Chiefs of Staff (JCS) priority.* If known, DOD agencies will provide the JCS priority for item to be test loaded in Air Force transport aircraft (see AR 59–8/AFR 76–38/OPNAVINST 4630.18D/MCD 4630.6C/DSAR 4540.9).

(11) *Proposed test location.* Test location should meet requirements as stated in paragraph B–1*a*.

(12) *Funding (except aircraft).* For each element of test support (other than the use of the aircraft), identify the responsible funding activity.

(13) *Proposed test completion date.* Insert a desired completion date for submission of test report.

(14) *Materials handling equipment.* Identify the type(s) and capacity of materials handling equipment (proper nomenclature) likely to be needed in loading, securing, and off-loading of each test time that is not available for use at the test site and is not provided by the requesting activity to support the test.

(15) *Test support resources.* List all of the personnel, facilities, and equipment that will be provided by the requesting activity to support the test.

(16) *In-test power requirements and equipment.* Give any special in-flight and/or ground power requirements or equipment needed.

(17) *Flight test/movement requirement.* If any item is to be flight tested, provide technical requirements for this type of test. If item is to be moved in conjunction with test loading, indicate destination and need for movement.

(18) *Hazardous materiels.* List all hazardous materiels in accordance with AFR 71–4/TM 38–250/NAVSUP PUB 505 (REV/MCO P4030.19D/DSAM 4145.3, or 49 CFR 170–179. Provide data requested for each item on DD Form 2083 or use separate sheet.

(19) *Safety/operational waivers and Department of Transportation (DOT) exemptions.* Identify each safety/operational waiver and DOT exemption that is requested, if any. Any waiver or exemption will be cited in this data item. Also, indicate escorts required and responsibility for any chemical, biological, etiological agents and radioactive materiel.

(20) *Data items 20–25.* Provide technical data as required on DD Form 2083.

(21) *Item 26 on DD Form 2083.* Disassembly potential. When disassembly of the item is required for test loading, the requesting activity will set forth any requirement for the item to be disassembled into the same configuration in which the item will be shipped. Disassembly of shock sensitive and complexly constructed items (such as radar sets) will ONLY be performed by

personnel authorized by the item developer. Requirements for testing or documenting either of these phases, including required test activity support, dimensional and weight criteria, and special disassembly problems, will be specified on a separate sheet.

(Locate figure B–1 (DD Form 2083), a fold-in illustration, at end of regulation.)

APPENDIX C

SURFACE MODE TRANSPORTABILITY TEST LOADINGS

C-1. Purpose and Scope. Items of equipment may require transportability test loadings on the surface transportation equipment either to verify transportability or to develop and verify transportation procedures. Materiel developers may accomplish such loadings at facilities of their service or by contract. In addition, the Departments of the Army and Navy will, upon request, accomplish surface testing. Transportability testing within a service or by contract will be accomplished in accordance with existing regulations and policies of the individual service. Requests for surface loading tests to be conducted by another service will be processed in accordance with the procedures contained in this appendix.

C-2. General. Static test loadings and dynamic transportability tests are performed and analyzed to ensure compatibility of the physical characteristics of cargoes and equipment with the dimensional and structural limitations of the transportation equipment, and available handling equipment. Items being tested will go through a sequence of events in accordance with a test program prepared by the item developer or designated test agency, approved by the testing agency, and executed by the test director. Services preparing a test loading request should, when feasible, plan to consolidate the requirement with other types of performance tests and/or with loading tests of other cargo items in the interest of economy.

C-3. Types of test. *a Static loading tests.* Static loading tests will consist of loading, restraint, and unloading of an item. The tests are to ensure that the item has no interface problem, and to develop or confirm procedures for handling, and for transportation movement.

b Dynamic transportability tests. Surface mode dynamic transportability tests of an item will be performed only after completion of a successful static loading test, or a determination by the test activity that a formal static test loading can be waived. Tests will involve actual transportation equipment movement and will subject the item to the dynamic, environmental, and operational conditions that can normally be expected to exist in military transport operations. These tests will be conducted where an item is susceptible to damage during normal transportation equipment movement, or when required for Federal or service regulatory compliance. Instrumentation will be installed and operated by the testing activity to record, to the extent deemed necessary by the item developer, the dynamic behavior and ambient environmental characteristics of each transportation equipment movement. Unusual requirements such as temperature limits, pressure limits, humidity control, power source required, or recording instruments requiring an outside power source will be identified in the test request.

C-4. Procedures. *a. Coordination between services.*

(1) Requests for test loading for ocean and land modes of transport will be forwarded through the transportability agent of the requesting service to the transportability agent of the testing service.

(2) To facilitate coordination of surface equipment, loading requests will be submitted to the Army or Navy transportability agent at a minimum of 90 days prior to the designated test date. Test loading requests will be submitted to the test activity by the service transportability agent at a minimum of 60 days prior to the designated test date. The test activity will coordinate tests with the requesting activity's project officer, appropriate approving agencies, and will review, evaluate, process, and concur with all test loading requests to ensure adequate preparation, scheduling, documentation, and completion of tests.

b. Approval and publication of transportability guidance.

(1) As a result of tests, the testing activity will provide appraisals of the loading, restraint, and off-loading procedures to the service requesting the test loading for inclusion in joint transportability guidance publications.

(2) Military Traffic Management Command (MTMC) provides DOD representation on the Association of American Railroads (AAR), Open Car Loading Committee. Requests for approval of loading drawings for inclusion in the AAR Open Top Car Loading Manual, requests for test shipments or proposals for new or revised loading rules may be submitted through the Commander, MTMC, (AR 55–355/NAVSUPINST 4600.70/AFM 75–2/MCO P4600.14/DLAR 4500.3).

c. Preparation of requests for transportability test loadings. When completing DD Form 2083, required information should be given as completely as possible. Provide precise measurements and information and include photographs, sketches, drawings, or any additional data that would be helpful in determination of transportability requirements. This form has been developed to cover requests for test loadings for all materiel, and all sections may not be applicable. When an item does not apply, enter "NA" (not applicable), or if unknown, enter "UNK". If data are unavailable but forthcoming, this should be indicated in the appropriate data item space and provide the projected date of availability. If additional space is required to provide information, identify data item by number and provide the description on a separate sheet, and attach to DD Form 2083. General instructions for completing DD Form 2083 are contained in appendix B. For surface transportability, the following modifications apply:

(1) *Distribution.* Three copies will be forwarded to the transportability agent of the service originating the test.

(2) *Item 6.* Type of request—complete part 6b only.

(3) *Item 9.* Type of aircraft—leave blank. If special carrier equipment is required, this equipment should be identified on an attached sheet.

(4) *Item 10.* Joint Chiefs of Staff priority—leave blank.

(5) *Item 19.* For water shipments of ammunition or explosives include US Coast Guard Class, 46 CFR 146 (CG–108).

The Army Office of primary interest in this joint publication is the Military Traffic Management Command. Army users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) direct to Commander, Military Traffic Management Command, ATTN: MT–SA, Department of the Army, Washington, DC 20315.

By Order of the Secretaries of the Army, the Navy, and the Air Force; and the Director, Defense Logistics Agency:

BERNARD W. ROGERS
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Chief of Staff

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J. C. PENNINGTON
Brigadier General, United States Army
The Adjutant General

JAMES W. NANCE
Rear Admiral, United States Navy
Assistant Vice Chief of Naval Operations
Director of Naval Administration

H. A. HATCH
Major General, US Marine Corps
Deputy Chief of Staff for Installations and Logistics

LEW ALLEN, JR., *General, USAF*
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JAMES J. SHEPARD, *Colonel, USAF*
Director of Administration

J. J. McALEER, JR.
Colonel, USA
Staff Director, Administration, DLA

DISTRIBUTION:

Army:

To be distributed in accordance with DA Form 12–9A requirements for AR, Research and Development.

Active Army: D
ARNG: None
USAR: D

Navy:

SNDL

A1	(ASN(MRA&L), ASN (RES) only) (2 each)
A2A	(CNR only) (5)
A4A	(CHNAVMAT) (25)
A5	(CHBUMED only) (2)
B5	(US Coast Guard Hq only) (5)
21A	(Fleet Commanders in Chief) (2 each)
41A	(COMSC) (5)
C4D	(ONR Resident Representatives) (1 each)
C4F9	(Laboratory Detachment) (1 each)
C4K	(CNM Project Managers) (1 each)
C4L	(Director of Naval Labs) (1)
E3A	(LAB ONR) (1 each)
E3B	(ONRBRO) (1 each)
FD1	(OCEANAV) (1)
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FKA1A	(NAVAIRSYSCOM) (50)
FKA1B	(NAVELEXSYSCOM (15)
FKA1C	(NAVFACENGCOM) (15)
FKA1F	(NAVSUPSYSCOM) (15)
FKA1G	(NAVSEASYSCOM (75)
FKA6A1	(NAVAIRDEVCEN) (1)
FKA6A2	(NAVWPNCEN) (1)
FKA6A3A	(DTNSRDC) (1)
FKA6A3B	(NAVCOASTSYSCEN) (1)
FKA6A9	(NAVSURFWPNCEN) (1)
FKA6A12	(NAVOCEANSYSCEN) (1)
FKA6A15	(NUSC NPT) (1)
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FKN7	(NAVNUPWRU) (1)
FKP1F	(NAVMINENGRAFAC) (1)
FKP1G	(NAVSHIPWPNSYSENGSTA) (1)
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OPs	(40, 41, 43, 45, 094, 941, 944, 945, 095, 098, 980 981, 982, 985, 986, 21, 22, 23, 32, 35, 37, 50, 51, 55 only) (2 each)

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Air Force: F
Marine Corps: MARCORPS CODES: 6025/3700/6901001, 002/7000156, 158
160, 164 (4)
8145 (2)
Defense Logistics Agency: 3;62

REQUEST FOR TRANSPORTABILITY LOADING/ANALYSIS

INSTRUCTIONS: *READ INSTRUCTIONS IN APPENDIXES B AND C, AR 70 44/OPNAVINST 4600.22B/AFR 80-18/MCO 4610.14C/DSAR 4500.25 CAREFULLY BEFORE COMPLETING THIS FORM APPENDIX A TO MIL STD 8421 ALSO APPLIES.*

TO:

FROM:

1. PROJECT NAME

2. SECURITY CLASSIFICATION OF TEST ITEM

3. NAME OF CONTRACTOR *(If applicable)*

4. CONTRACT NUMBER

5. TYPE OF ITEM

6. TYPE OF REQUEST

a. AIR
- ☐ DESIGN ANALYSIS
- ☐ AIR TRANSPORTABILITY REVIEW
- ☐ STATIC LOADING TEST
- ☐ TEST LOADING w/FLIGHT TEST OR MOVEMENT

b. SURFACE
- ☐ HIGHWAY
- ☐ RAIL
- ☐ WATER
- ☐ STATIC LOADING
- ☐ DYNAMIC TEST

7. PROPOSED TEST DATE

8. MODE TRANSPORTABILITY POTENTIAL *(Anticipate frequency of MOVEMENT)*
☐ ONE-TIME ☐ OCCASIONAL ☐ ROUTINE

9. TYPE OF AIRCRAFT
☐ C-130 ☐ C-141 ☐ C-5 ☐ SAAM REQUESTED ☐ _____ OTHER *(Specify)*

10. JCS SAAM PRIORITY

11. PROPOSED TEST LOCATION

12. FUNDING *(Identify funding activity)*

13. DESIRED TEST COMPLETION DATE

14. MATERIAL HANDLING EQUIPMENT AND MATERIAL REQUIRED

15. TEST SUPPORT RESOURCES

16. IDENTIFY IN-TEST POWER REQUIREMENTS

17. FLIGHT TEST OR MOVEMENT REQUIREMENTS *(Provide reasons for flight)*

18. HAZARDOUS MATERIALS *(See CFR 49 and AFR 71-4/DSAM 4145.3/TM 38-250/NAVSUP Pub 505/MCO P4030.19)*

DOT CLASS_____ DOT ARTICLE NAME_____

NET EXPLOSIVE WEIGHT_____ DOT CLASS A OR B EXPLOSIVE_____

NOTE: Provide the following data on a separate sheet: VENTING REQUIREMENTS, PROTECTIVE CLOTHING REQUIRED, DISASTER RESPONSE FORCE REQUIRED; AND DATA TO SHOW COMPLIANCE WITH CFR 49 AND AFR 71-4.

19. IDENTIFY SAFETY AND OPERATIONAL WAIVERS AND SPECIAL PERMITS

DD FORM 1 AUG 77 2083

20. DRAWINGS OR SKETCHES OF EQUIPMENT TO INCLUDE TIE-DOWN POINTS AND CAPACITY. DETAIL THE DIMENSIONS OF SYSTEMS, EQUIPMENT, AND MUNITIONS THAT ARE NON-SYMMETRICAL, VEHICLE CHASSIS CLEARANCE, VEHICLE OVERHANG AND ANY ADDITIONAL INFORMATION AVAILABLE TO AID IN LOADING ANALYSIS.

WEIGHT (lb)	HEIGHT (in.)	LENGTH (in.)	WIDTH (in.)	CG LOCATION		
				LATERAL	LONGITUDINAL	VERTICAL
				Right or left of center line.	From front axle.	Above ground.

21. SPECIAL TRANSPORTABILITY CHARACTERISTICS OR CONSIDERATIONS: *(Include fragility, shock, vibration and special equipment required)*

22. UNUSUAL PROJECTIONS, DIMENSIONAL CHARACTERISTICS.

23. WHEEL CONFIGURATION

SKETCH IN BOTTOM VIEW SHOWING TIRE AND AXLE LOCATION. PROVIDE ALL DIMENSIONS.

TIRE SIZE	TIRE CONTACT AREA
TIRE PRESSURE	NUMBER TIRES
LIST ALL AXLE LOADS	

24. TRACK CONFIGURATION

SKETCH IN BOTTOM VIEW SHOWING TRACK LOCATION. PROVIDE ALL DIMENSIONS.

TRACK PRESSURE
FOOT PRINT
TRACK PAD LOAD *(Under a ground wheel on hard surface)*

25. SKIDDED/FLAT BOTTOM CONFIGURATION. *(Includes all items to be placed on pallets/platforms.)* FOR SKIDDED CONFIGURATION, SKETCH IN BOTTOM VIEW SHOWING SKID SIZE AND LOCATION. FOR ALL CONFIGURATIONS, PROVIDE LOCATION AND WEIGHTS OF ANY CONCENTRATED LOAD AND LOADS PER LONGITUDINAL FOOT.

26. DISASSEMBLY POTENTIAL – ON SEPARATE SHEET SHOW DIMENSIONS AND WEIGHTS OF EACH SECTION TOGETHER WITH ANY SPECIAL LOADING, SECURING OR FRAGILITY REQUIREMENTS.

NAME, TITLE AND ORGANIZATION OF PROJECT ENGINEER	TELEPHONE NUMBER ☐ COMMERCIAL ☐ AUTOVON
NAME, TITLE AND ORGANIZATION OF RESPONSIBLE OFFICIAL	SIGNATURE OF RESPONSIBLE OFFICIAL

Figure B-1—Continued